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(21) International Application Number: PCT/SE99/00197 (22) International Filing Date: 16 February 1999 (16.02.99) (30) Priority Data: 9800455-9 17 February 1998 (17.02.98) SE (71) Applicant: TELIA AB (publ) [SE/SE]; Mårbackagatan 11, S-123 86 Farsta (SE). (72) Inventors: AYOUB, Souhad; Terapivägen 8b, S-141 55 Huddinge (SE). WINROTH, Mats, Olof; Lyckogången 4, S-135 54 Tyresö (SE). (74) Agent: PRAGSTEN, Rolf; Telia Research AB, Vitsandsgatan 9, S-123 86 Farsta (SE).		(81) Designated States: EE, LT, LV, NO, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: METHOD FOR TRANSMISSION OF SHORT MESSAGES IN A MOBILE TELECOMMUNICATIONS SYSTEM (57) Abstract The invention relates to a method in a digital mobile telephone system which makes possible broadcast-transmission of Short Voice Messages, SVM, over a packet switched carrier, for instance GPRS. The invention is characterised in that a short voice message can be transmitted to one or more receivers, and that the carrier which is utilised at the transmission is GPRS. Further, the voice message is speech encoded, and is transmitted over GPRS, at which the voice message is decoded and played out directly in the mobile terminal, or in one with the mobile terminal co-operating application.		

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TITLE OF THE INVENTION: METHOD FOR TRANSMISSION OF SHORT
MESSAGES IN A MOBILE
TELECOMMUNICATIONS SYSTEM

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FIELD OF THE INVENTION

The present invention relates to a method of transmission of short messages in a mobile telecommunications system.

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PRIOR ART

In the GSM of today there are means of transmitting a text message to a mobile in two ways: on one hand via SMS (Short Message Service), and on the other via SMS-CB (SMS
15 Cell Broadcast). SMS is already today frequently used, but we will in all probability also see an increased use of Cell Broadcast, which will be possible to use for instance for advertising, position directed traffic information (per cell) etc.

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In many cases it also should be useful to transmit a short message in form of speech, instead of text only. Examples of applications can be:

- general traffic information, where the driver often
25 is busy driving a car;
- information to a certain group of users, for instance information to the cars of a taxi firm in a certain area;
- a new form of mail box function, which transmits the
30 whole voice message which can be stored on telephone, or to that connected equipment.

The above mentioned service concept (short message in speech) does not exist defined for GSM (or for any other cellular standard).

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The aim of the present invention consequently is to effect a system which makes possible this service concept.

In order to find out how prior art is concerned with short speech messages over for instance GSM by means of a packet switched carrier, such as GPRS, a preliminary investigation was performed, at which the following documents were found:

	Document: 1:	DE,A1,	43 40 679
	2:	US,A,	5 577 103
	3:	US,A,	4 905 003
10	4:	JP,A,	5-260 000
	5:	US,A,	5 673 268
	6:	US,A,	5 673 257
	7:	US,A,	5 619 508
	8:	US,A,	5 617 423
15	9:	US,A,	5 600 649
	10:	US,A,	5 592 586
	11:	US,A,	5 577 041
	12:	US,A,	5 574 725
	13:	US,A,	5 559 793
20	14:	US,A,	5 546 395
	15:	US,A,	5 535 204
	16:	US,A,	5 500 859
	17:	US,A,	5 471 470
	18:	US,A,	5 453 986
25	19:	US,A,	5 452 289
	20:	US,A,	5 956 875
	21:	US,A,	4 468 813
	22:	WO,A1,	93/00778

At the preliminary investigation, however, no documents were found describing transmission of short speech messages over a packet switched radio carrier, such as General Packet Radio Service. Two documents (document 1 and 2) describes transmission of voice messages by means of SMS, but here this is performed by normal text transmission and after that speech synthesis to speech. Document 3

relates to transmission of analogue signals, after which the analogue information is converted to a digital format and is stored.

5 A large number of documents further have been found describing transmission of digital voice data (document 5-19). The transmission, however, is not made over the cable-based telecommunications system. Document 20 relates to broadcasting of emergency or SOS-information by means of FM-transmitters.

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BRIEF DESCRIPTION OF THE INVENTION

The above mentioned aim is achieved by a method for transmission of short messages in a mobile telecommunications system, at which said short messages are speech messages which are transferred by means of a packet
15 switched radio carrier such as GPRS.

An advantage of the invention is that it can be utilised for general traffic information when a driver is busy driving a car.

20 One further advantage is that a voice message can be stored directly in the telephone, which results in that a subscriber need not call his/her own voice mailbox and load the network unnecessarily.

Further characteristics of the invention are given in
25 the subclaims.

DETAILED DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

In the future the GSM-system will, by the introduction of General Packet Radio Service (GPRS), be able to offer
30 packet switched services, in contrast to the circuit switched services of today. GPRS is a cost efficient service in the sense that a GPRS-mobile utilises the radio channel only when it has data to transmit or receive. The advantage of GPRS is short setting-up time compared with
35 today's voice traffic, high data rate, and more efficient utilisation of radio resources. GPRS further can be used as

"best effort"-service, which means that one only utilises free capacity. GPRS probably will be cheaper than a circuit switched service.

GPRS is a packet switched service which initially will offer non-real-time services such as Internet-services. On the other hand, GPRS will not offer ordinary telephony. The difference between real time services and non-real-time services is the Delay-demand. Delay is a measure of how long time it will take to transmit bit data from a user to another. Telephony is a real-time service which has a delay demand of a few milliseconds, whereas Internet-services have lower delay-demands.

GPRS is not intended to be used as carrier of speech in real-time. By this invention GPRS can transfer non-real-time speech in order to satisfy the need for future services which are adapted to GPRS.

There are especially three GPRS-carrier services which are of interest to the voice service:

- GPRS PTP (Point-to-Point): Voice message to one single subscriber: For instance voice mailbox.
- GPRS PTM-M (Point-to-Multipoint Multicast): One-way voice message to all, or a group of, subscribers in a certain geographical area: For instance general traffic information.
- GPRS PTM-G (Point-to-Multipoint Group): Voice message to a group of subscribers, possibly within a geographical area, but the communication can be two-way: For instance communication within a taxi firm.

The present invention consequently presents a new carrier service or application which shall transfer short speech messages over a packet switched carrier, for instance GPRS. The service can be either a telecommunications service, i.e. all necessary functionality is in the mobile terminal, or an application connected to the mobile terminal which uses for instance

GPRS as carrier of the voice information. The service is called SVM (Short Voice Message).

The principle of SVM is very simple. It amounts to that the speech message is speech encoded, in an application in the network or in another mobile terminal, and is transmitted to the receiver via GPRS. When the message has been received, the message can be decoded and be read/played; either directly in the GPRS-mobile, or in an application outside.

SVM opens new opportunities to quite new services, and refines existing services. SVM requires that the mobile has a memory in it to receive and store speech messages. The size of the speech message is of the order of a few seconds, and shall be possible to be held on the SIM-cards of tomorrow, or on a chip card in future terminals.

The background of this invention is on one hand that the SMS-service (Short Message Service) and its telecommunications services in today's GSM systems and, on the other, its future need of new carrier services and telecommunications services which will suit in GPRS.

SVM will offer new, simpler solutions to the telecommunications services of today, and opens new possibilities to new telecommunications services. SVM will be able to transfer PTP (Point-to-Point) and PTM (Point to Multipoint) telecommunications services which will fit into a GPRS-standard. In addition to this, SVM will broaden the market, and aim at new user groups.

In the mobile networks of today, SMS is used to transmit text messages. Text messages can be transmitted from one subscriber to another, as a common short text message, or from the network to a subscriber to inform about, for instance, new messages on his/her mobile mail box or "fax box" etc. SMS is a non-real-time service. It is transmitted on the signalling channel and has a comparatively low delay demand. In GPRS it will be possible to transmit SMS on common GPRS traffic channels.

SVM will function roughly in the same way as SMS, but with speech instead of text. The advantage of SVM are plenty and can be summarised by saying that speech in some connections is better than text. Some examples of SVM-services are described below.

Mobile answer is a telecommunications service which today is used in GSM and which can be modified to adapt to GPRS. In the systems of today, there is a central database in the network, where the messages of all mobile answers are stored. When a message has been recorded, an SMS is transmitted to the mobile which calls the central database in order to listen to the recorded message. All recorded messages are stored in the network, and each time one needs to listen, or listen again, to a message, a connection is established and a radio resource is used. To listen, and listen again, to all ones mobile answer messages loads the network unnecessarily. SVM can be used as carrier to such a service. One can conceive that complete mobile answer messages are transmitted to the mobile via SVM in order to after that be stored on the SIM-card, or in the mobile, once and for all. The advantage is that GPRS is used and that no establishing of connection is needed to listen, or listen again, to messages, which reduces the load in the network.

"Traffic information" is one of future GPRS-services. "Traffic information" will be some kind of PTM-service. One example can be that road-users on motorways are informed about, for instance, road conditions, accidents etc. An alternative can be that the network transmits SMS to all cars which are on a specific motor-way. Another alternative is that the network transmits an SVM instead of SMS and the message is read out on the car stereo. This implies a connection between the GPRS-terminal and the car stereo, which is simple to implement. The special point about the latter alternative is that the car driver need not read text messages (SMS) while he/she is driving, which from a

road safety point of view is very important. The car stereo is one example of where an SVM-application might be located, if it is not located in the GPRS-terminal itself. In the cars of the future we will also have a number of new data supported functions with mobile data integrated in the system: Map data information, graphic Head-Up-Display with traffic information etc. With such an equipment SVM easily can be integrated.

One more PTM GPRS-service can be that one transmits advertisements via SVM to all mobiles which are within a specific area, or to a specific target group.

SVM also gives means for new services, new products and new user groups. One example can be a new "minicall"-terminal and a new "minicall" service. A conceivable minicall GPRS-terminal with a memory and a loudspeaker can be a cheap alternative. A new "minicall"-service adapted to the minicall GPRS-terminal can be that one transmits an SVM-message. A conceivable user group for such a service can be children or handicapped who neither can read nor use a complicated mobile terminal. The advantage of such a service, compared with today's minicall, is that one will have international coverage, and a confirmation from the receiver at succeeded reception, when it uses GPRS as carrier.

There certainly are a lot of fields of application, as well as applications, which can utilise SVM as carrier service and telecommunications service.

The invention is primarily intended to be used for broadcast of voice information for, for instance, traffic information and advertising. The service in addition can be used to create a distinctive image for Telia as operator.

To sum up can be said that the invention is characterised in that:

a short voice message can be transmitted to one or a lot of users; the carrier utilises GPRS PTP, GPRS PTM, or other similar carrier service; also non-packet-switched

carriers can be used, but will reduce the advantages of the service; the voice messages are speech encoded and are transmitted over a packet switched radio carrier; voice messages are decoded and played, either directly in the mobile terminal, or in an application outside, i.e. the SVM-application can be integrated in the mobile terminal, or outside the terminal in a device connected to said mobile terminal; the speech encoder can be a GSM's speech encoder, because this decoding function already exists in the GSM-terminal (provided that the terminal does not only support GPRS); also other speech encoders are conceivable, especially in the case where the SVM-application is located outside the mobile terminal; a voice mailbox transmits voice messages directly to the user via SVM, where the message at optional time can be listened to, and saved, without the user needing to "call" mobile answer; traffic information can be transmitted via SVM so that a driver of a car need not read SMS-text while driving; the application SVM can be implemented integrated in future data communications solutions for cars.

The above mentioned is only to be regarded as an advantageous embodiment of the invention, and the extent of protection of the invention is only defined by what is indicated in the following patent claims.

PATENT CLAIMS

1. Method for transmission of short messages in a mobile telecommunications system, characterised in that said short messages are voice messages which are transferred by means of just any radio carrier.

2. Method as claimed in patent claim 1, characterised in that said radio carrier is a packet switched radio carrier.

3. Method as claimed in any of the previous patent claims, characterised in that said voice messages are non-real-time messages.

4. Method as claimed in any of the previous patent claims, characterised in that said voice messages are speech encoded and transmitted over said packet switched radio carrier, at which said voice messages are decoded and played in a mobile terminal, which supports said radio carrier, or in an equipment connected to said mobile terminal.

5. Method as claimed in patent claim 4, characterised in that said voice messages are speech encoded in said mobile terminal's speech encoder, preferably a GSM speech encoder.

6. Method as claimed in patent claim 5, characterised in that said voice messages are stored in said mobile terminal's memory/SIM-card.

7. Method as claimed in any of the previous patent claims, characterised in that said packet switched radio carriers consist of GPRS.

8. Method as claimed in any of the previous patent claims, characterised in that said voice messages are transmitted to mobile terminals or equipment connected to said mobile terminals, such as broadcast-information, for instance traffic information, or advertising information.

9. Method as claimed in any of the previous patent claims, characterised in that a voice mailbox in said telecommunications system transmits voice messages (SVM) via GPRS directly to a mobile terminal/equipment
5 connected to said mobile terminal, at which subscriber connected to said mobile terminal/equipment can listen to said voice messages at optional point of time without needing to call mobile answer.

10 10. Method as claimed in any of the patent claims 7-9, characterised in that said GPRS-carrier service consists of:

- GPRS PTP which relates to voice messages to one single subscriber, such as messages from a voice mailbox;
- GPRS PTM-M which relates to one-way voice messages to
15 all, or a group of, subscribers within a certain geographical area;
- GPRS PTM-G which relates to voice message to a group of subscribers, at which the communication is two-way.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/00197

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 7/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5644627 A (NIRARJAN NATH SEGAL ET AL), 1 July 1997 (01.07.97), column 1, line 39 - line 45; column 3, line 17 - line 22; column 3, line 41 - column 4, line 18, figures 2,7, column 4, line 41 - line 45; column 5, line 7 - line 10; column 7, line 38 - column 8, line 22	1,4-6,9
Y	--	2-3,7,8,10
Y	EP 0645941 A2 (ALCATEL SEL AKTIENGESELLSCHAFT), 29 March 1995 (29.03.95), column 3, line 50 - column 4, line 1; column 6, line 9 - line 21	2,3,7
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 9430023 A1 (CELLTRACE COMMUNICATIONS LIMITED), 22 December 1994 (22.12.94), page 4, line 34 - page 5, line 1 --	8,10
P,A	WO 9825422 A1 (NOKIA TELECOMMUNICATIONS OY), 11 June 1998 (11.06.98), abstract -- -----	1,2,7,10

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SE 99/00197

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
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				DE	69414273 D,T	24/06/99
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